

Inventory Management Problems

191

(Ghiani, Laporte, Musmanno : Chap. 4)
(4.1, 4.2, 4.3)

Inventories: stockpiles of items (raw materials, components ... finished goods) waiting to be processed, transported or used

Motivations: improving service level, reducing overall logistics costs, coping with randomness in customer demands...

But: holding inventories can be very expensive

It is therefore crucial to solve inventory management problems: for each stocking point in the supply chain, to decide when to reorder (for a single or multiple products) and how much to order so that the expected (annual) cost is minimized while achieving a certain service level

Relevant involved costs:

192

- 1) Procurement costs: associated with the acquisition of goods; can be fixed costs or variable costs (i.e. dependent on the amount acquired): e.g. (fixed) reorder cost, (variable) purchasing or manufacturing cost, transportation cost ...
- 2) Inventory holding costs: incurred when materials are stocked for a period of time: e.g. opportunity (or capital) cost, i.e. the return on investment the firm would have realized if money had been invested in a profitable economic activity instead of inventory; warehousing cost (may include space and equipment costs, maintenance costs, taxes ... or fee to pay for storing)

3) Shortage costs; are paid when customer orders are not met:

- lost sales costs (lost profit and negative effect on future sales)
- back order costs (in case of a delayed sale, often a penalty has to be paid)

4) Obsolescence costs

Inventory Management models can be classified according to various criteria:

- Deterministic versus stochastic models:
 - in a deterministic model, demands, costs, lead times ... are assumed to be known in advanced, while in a stochastic model some data are uncertain